

### Inspection

1. Service the starter reduction assembly as described in *Flywheel and Starter Clutch* in this chapter.
2. Service the neutral/reverse switch as described in Chapter Nine.
3. Clean and dry the rear crankcase cover.
4. Inspect the final driveshaft (A, **Figure 51**) and reverse spindle (B) oil seals for leaks or damage. When replacing the oil seals, note the following:
  - a. Remove the oil seal by prying it out of the cover with a wide-blade screwdriver.
  - b. Check the oil seal mounting bore for cracks or other damage.
  - c. Pack the lip of the new oil seal with grease.
  - d. Install both oil seals with their flat side facing out (A and B, **Figure 51**).

### FLYWHEEL AND STARTER CLUTCH

This section describes service to the starter reduction gears, flywheel and starter clutch assembly.

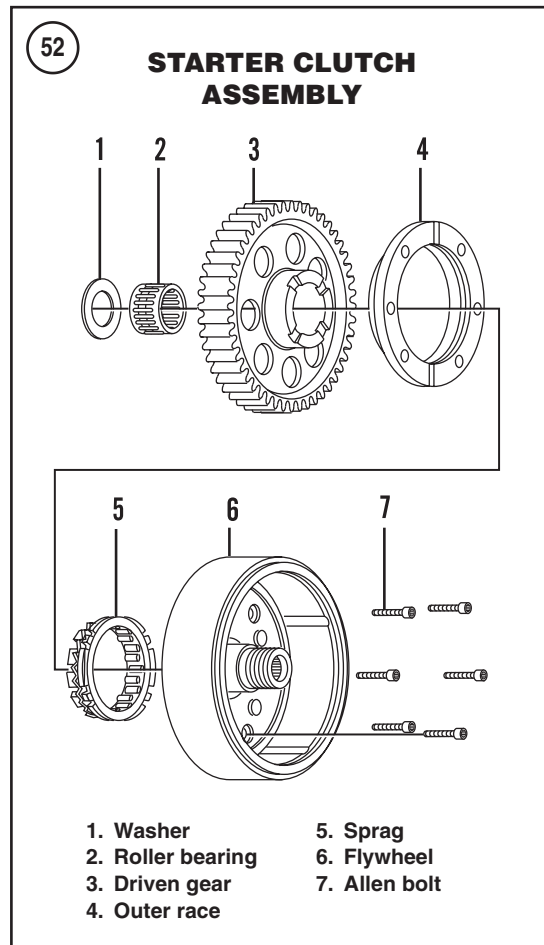
Refer to **Figure 52** when performing the following procedures.

#### Flywheel Puller

A flywheel puller is required to remove the flywheel from the crankshaft. Use Honda flywheel puller part No. 07725-00400000 (**Figure 53**).

#### Flywheel Removal

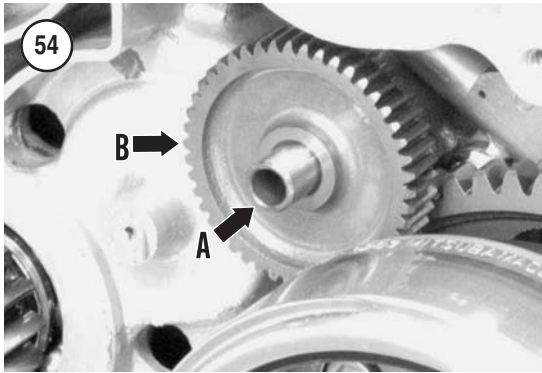
1. Remove the rear crankcase cover as described in this chapter.



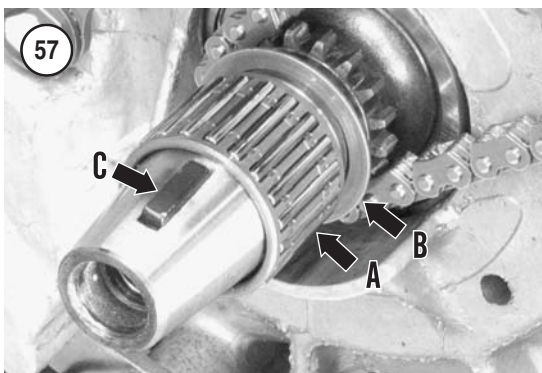
2. Remove the starter reduction gear shaft (A, **Figure 54**) and gear (B) if they were not previously removed.

#### NOTE

Apply grease to the puller bolt threads and the tip of the puller stem.



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3. Install the flywheel puller into the flywheel.

#### CAUTION

*Do not try to remove the flywheel without a puller. Any attempt to do so will ultimately lead to some form of damage to the crankshaft and flywheel.*

#### CAUTION

*If normal flywheel removal attempts fail, do not force the puller. Excessive force will strip the flywheel threads, causing expensive damage. Take the engine to a dealership and have them remove the flywheel.*

4. Hold the flywheel and gradually tighten the flywheel puller (**Figure 55**) until the flywheel pops off the crankshaft taper.
5. Remove the puller from the flywheel.
6. Remove the flywheel and the starter clutch assembly (**Figure 56**).
7. Remove the roller bearing (A, **Figure 57**) and washer (B).
8. If necessary, remove the Woodruff key (C, **Figure 57**) from the crankshaft keyway.
9. Inspect the flywheel, starter clutch and starter reduction gear assembly as described in this section.

### Starter Clutch Removal/Inspection/Installation

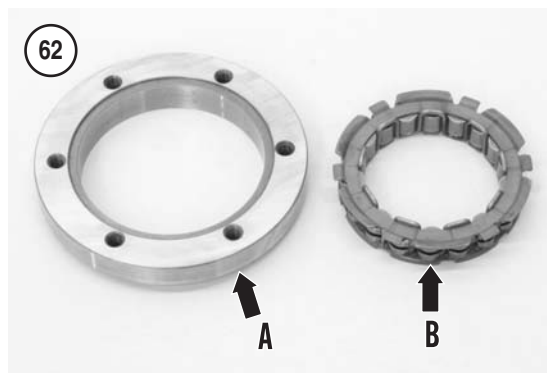
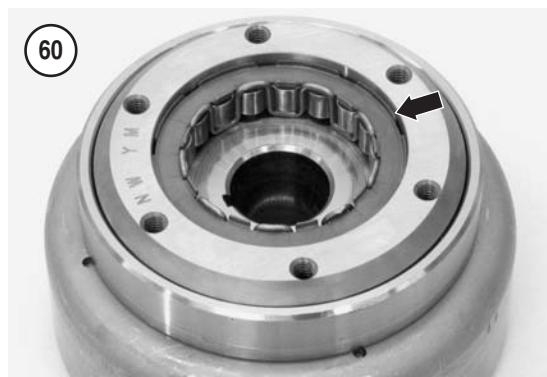
Refer to **Figure 52** when servicing the starter clutch assembly.

1. Check the one-way clutch operation as follows:
  - a. Place the flywheel and starter clutch on the workbench so the driven gear faces up as shown in **Figure 58**.

- b. Hold the flywheel and try to turn the driven gear clockwise and then counterclockwise. The driven gear should only turn clockwise as viewed in **Figure 58**.
    - c. If the driven gear turns counterclockwise, the one-way clutch is damaged and must be replaced as described later in this procedure.
  2. Remove the driven gear from the one-way clutch assembly.
  3. Inspect the driven gear (**Figure 59**) for the following conditions:
    - a. Worn or damaged gear teeth.
    - b. Worn or damaged bearing shoulder.
    - c. Measure the outside diameter of the bearing surface and refer to **Table 2**.
  4. Inspect the one-way clutch (**Figure 60**) for the following conditions:
    - a. Severely worn or damaged one-way clutch rollers.
    - b. Loose one-way clutch Torx bolts.
  5. Replace the one-way clutch (**Figure 60**) as follows:
    - a. Secure the flywheel with a strap or band wrench.
    - b. Using an impact driver, remove the one-way clutch mounting bolts (**Figure 61**).
    - c. Separate the clutch outer race (A, **Figure 62**) and the sprag clutch (B).
    - d. Install the sprag clutch into the outer race so the flange on the sprag fits into the recess in the outer race as shown in **Figure 63**.
    - e. Apply a medium strength threadlock to the threads of each mounting bolt.
    - f. Install the one-way clutch mounting bolts finger-tight, then tighten them to 23 N•m (17 ft.-lb.).
  6. Inspect the roller bearing (2, **Figure 52**). The rollers should be smooth and polished with no flat spots, cracks or other damage. Inspect the bearing cage for cracks or other damage. Replace the bearing if necessary.
  7. Inspect the washer (1, **Figure 52**) for cracks, scoring or other damage.

### Flywheel Inspection

1. Clean and dry the flywheel (**Figure 56**).
2. Check the flywheel for cracks or breaks.





### Starter Reduction Assembly Inspection

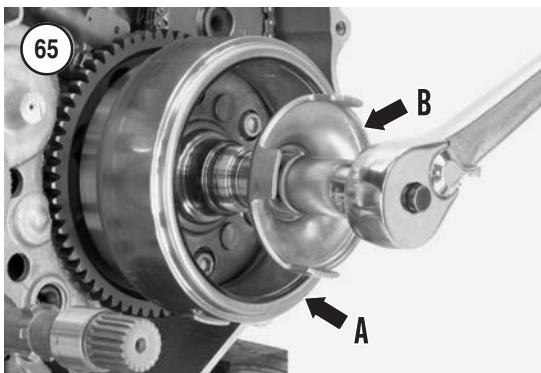
Replace parts that show damage as described in this section.

1. Clean and dry the gear and shaft (**Figure 64**).
2. Inspect the reduction gears for the following conditions:
  - a. Excessively worn or damaged gear teeth.
  - b. Excessively worn or damaged bearing surfaces.
3. Inspect the reduction shaft for excessive wear or damage.



### Flywheel Installation

1. Apply engine oil to the one-way clutch rollers and the driven gear shoulder.
2. To install the driven gear:
  - a. Place the flywheel on the workbench so the one-way clutch faces up.
  - b. Rotate the driven gear clockwise and slide it into the one-way clutch (**Figure 58**).
3. Apply engine oil onto the washer and needle bearing before installing them onto the crankshaft.
4. Install the washer (B, **Figure 57**) and the roller bearing (A) onto the crankshaft.
5. Install the Woodruff key (C, **Figure 57**) into the crankshaft keyway if it was removed.
6. Align the keyway in the flywheel with the Woodruff key in the crankshaft and install the flywheel (A, **Figure 65**).



#### WARNING

*Replace a cracked or chipped flywheel. A damaged flywheel can fly apart at high rpm, throwing metal fragments into the engine. Do not attempt to repair a damaged flywheel.*

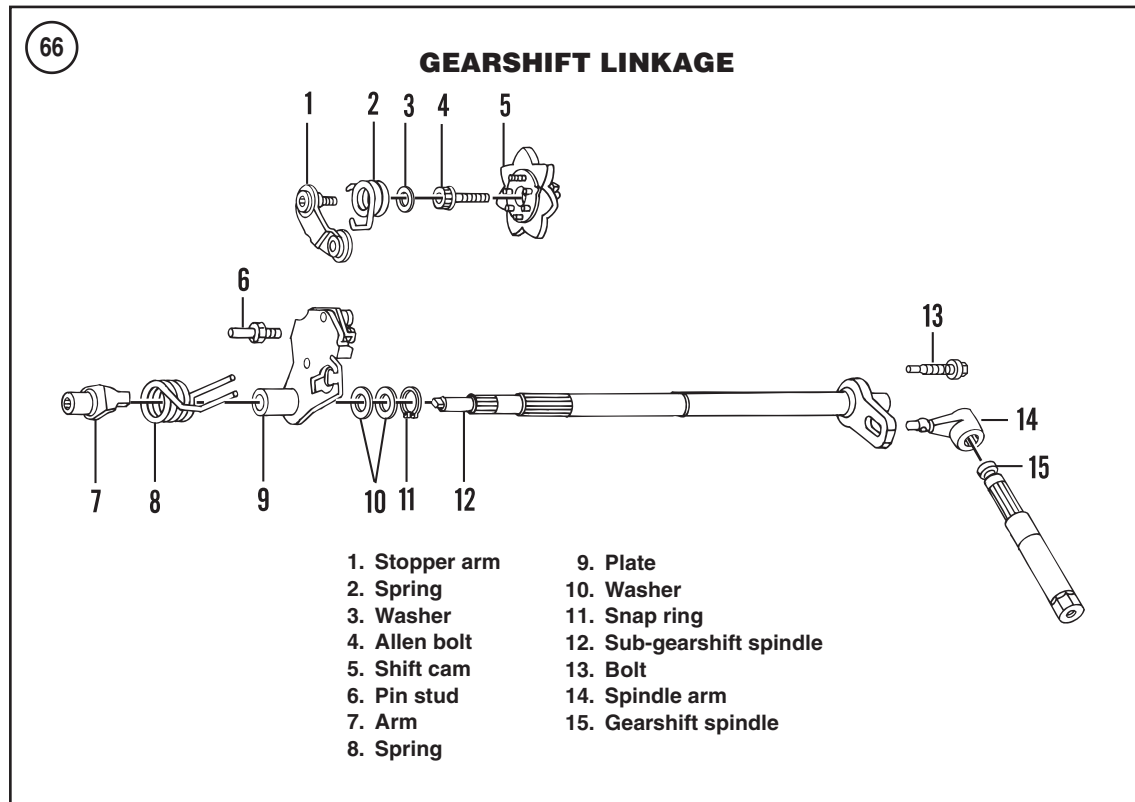
3. Check the flywheel tapered bore and the crankshaft taper for damage.
4. Replace damaged parts as required.

#### NOTE

*Performing Step 7 will seat the flywheel on the crankshaft taper. If the flywheel is not secured in this manner, magnetic force will pull the flywheel off the crankshaft when the stator coil (alternator cover assembly) is installed.*

7. Secure the flywheel to the crankshaft as follows:
  - a. Temporarily install the recoil starter pulley (B, **Figure 65**) and the mounting bolt.
  - b. Hold the flywheel and tighten the mounting bolt sufficiently to seat the flywheel on the taper.
  - c. Remove the mounting bolt and the recoil starter pulley (B, **Figure 65**).
8. Install the reduction gear (B, **Figure 54**), then insert the shaft (A).





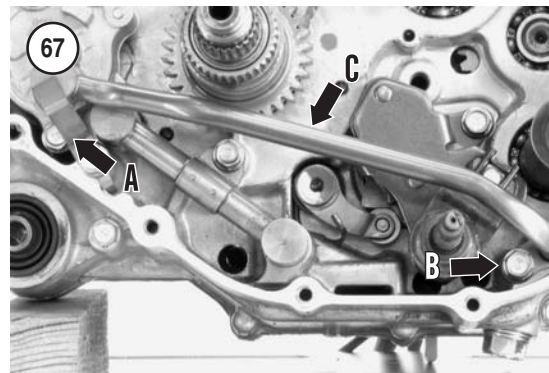
9. Install the rear crankcase cover as described in this chapter.

### GEARSHIFT LINKAGE

The transmission gears are shifted manually on FM and TM models using a typical foot-operated gearshift lever. On FE and TE models, gears shifting is accomplished using the Electric Shift Program (ESP), which is described in Chapter Nine. FE and TE models are equipped with essentially the same gearshift components as the FM and TM models. On FM and TM models, the gearshift lever is attached to the gearshift spindle. On FE and TE models, the gearshift lever is absent and the gearshift spindle has a hex end so it may be used for emergency shifting purposes.

The gearshift linkage assembly is mounted on the front side of the engine, behind the clutch cover. While the linkage is accessible without removing the engine, servicing the gearshift spindle assembly will require engine removal.

Refer to **Figure 66** when servicing the gearshift linkage assembly in the following sections.



### Removal

1. If the engine is installed in the frame, remove the gearshift pedal.
2. Remove the clutch cover (Chapter Six).
3. Remove the centrifugal clutch and change clutch assemblies (Chapter Six).
4. When servicing the gearshift spindle assembly, remove the rear crankcase cover as described in this chapter.

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